

Tarmac Cement  
 National Laboratory  
 Yelsway Lane  
 Waterhouses  
 Staffordshire  
 ST10 3AZ

14.11.2022

**Composition of Fly ash**

**Tudela Fly ash  
 EN 450-1 LOI Cat. B, Fineness Cat.N  
 0099-CPR-A95-0019**

Based on the **August 2022** monthly composite sample:

Property			Value	BS EN 450-1 Limit
Fineness (Residue)	45µm	%	14.6	Declared Value 15% ± 10% (Tested in accordance with BS EN 450-1 cl. 5.3.1)
APD		g/cm <sup>3</sup>	2.53	< 200kg/m <sup>3</sup> from declared value
28 Day Activity Index – July sample		%	81	>75%
90 Day Activity Index – June sample		%	92	>85%
Sulfate	SO <sub>3</sub>	%	1.56	≤ 3.0%
Loss on Ignition	LOI	%	3.19	≤ 7.0%
Chloride	Cl <sup>-</sup>	%	0.01	≤ 0.1%
Calcium Oxide	CaO	%	6.35	≤ 10.0%
SiO <sub>2</sub> + Al <sub>2</sub> O <sub>3</sub> + Fe <sub>2</sub> O <sub>3</sub>	-	%	82.39	≥ 70.0%
Free Lime	-	%	0.51	≤ 1.5%
Alkalis	Na <sub>2</sub> Oeq	%	1.36	≤ 5.0%
Declared Mean Alkali Content	Na <sub>2</sub> Oeq	%	1.50	-
Declared Maximum Chloride Content	Cl <sup>-</sup>	%	0.05	-

\*BS EN 933-10:2009 method replacing the 63 µm sieve with a 45 µm sieve

For and on behalf of Tarmac Cement:

*S. Chudley*

**Simon Chudley**

**National Commercial Technical Manager  
 Tarmac Cement**

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Tarmac Trading Limited Registered in England and Wales. Company No. 453791  
 Tarmac Cement and Lime Limited Registered in England and Wales. Company No. 66558  
 Tarmac Services Limited Registered in England and Wales. Company No. 8197397  
 Registered address for all companies: T3 Trinity Park, Bickenhill Lane, Birmingham, B37 7ES

T3 Trinity Park, Bickenhill Lane,  
 Birmingham, B37 7ES  
**0345 812 6232 info-cement@tarmac.com**

**Conformity of Fly Ash to BS 8500-2: Annex A  
Tudela EN 450-1 Fly Ash  
0099-CPR-A95-0019**

Based on the composite samples for the month of: August 2022

Constituent	Source
EN 450-1 Fly Ash	Tudela
EN 197-1 CEM I	Aberthaw

The results of compressive strength testing (in accordance with BS EN 196-1) of a 70:30 blend of CEM I with Fly Ash were:

2 Day Strength (MPa)	22.7
28 Day Strength (MPa)	48.2

Based on equivalent results obtained for the last 12 months, the permitted proportions of combinations conforming to the requirements of Annex A of BS 8500-2 are:

Strength Class of Combination	Fly Ash Content (%)	
	Min	Max
32,5L	24	35
42,5L	6	32

BS 8500-2 Combination Designation	Fly Ash Content (%)	
	Min	Max
CIIA-V	6	20
CIIB-V	21	35

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Tudela EN 450-1 Fly Ash  
0099-CPR-A95-0019**

Based on the composite samples for the month of: August 2022

Constituent	Source
EN 450-1 Fly Ash	Tudela
EN 197-1 CEM I	Alhandra

The results of compressive strength testing (in accordance with BS EN 196-1) on a 70:00 blend of CEM I with GGBS were:

7 Day Strength (MPa)	23.4
28 Day Strength (MPa)	45.7

Based on equivalent results obtained for the last 3 month, the permitted proportions of combinations conforming to the requirements of Annex A of BS 8500-2 are:

Strength Class of Combination	Fly Ash Content (%)	
	Min	Max
32,5N	8	35
42,5N	6	15

BS 8500-2 Combination Designation	Fly Ash Content (%)	
	Min	Max
CIIA-V	6	20
CIIB-V	21	35

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Tudela EN 450-1 Fly Ash  
0099-CPR-A95-0019**

Based on the composite samples for the month of: August 2022

Constituent	Source
EN 450-1 Fly Ash	Tudela
EN 197-1 CEM I	Cauldon

The results of compressive strength testing (in accordance with BS EN 196-1) of a 70:30 blend of CEM I with Fly Ash were:

2 Day Strength (MPa)	22.4
28 Day Strength (MPa)	48.5

Based on equivalent results obtained for the last 12 months, the permitted proportions of combinations conforming to the requirements of Annex A of BS 8500-2 are:

Strength Class of Combination	Fly Ash Content (%)	
	Min	Max
32,5L	12	35
42,5L	6	28

BS 8500-2 Combination Designation	Fly Ash Content (%)	
	Min	Max
CIIA-V	6	20
CIIB-V	21	35

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Tudela EN 450-1 Fly Ash  
0099-CPR-A95-0019**

Based on the composite samples for the month of: August 2022

Constituent	Source
EN 450-1 Fly Ash	Tudela
EN 197-1 CEM I	Dunbar

The results of compressive strength testing (in accordance with BS EN 196-1) of a 70:30 blend of CEM I with Fly Ash were:

2 Day Strength (MPa)	23.7
28 Day Strength (MPa)	45.7

Based on equivalent results obtained for the last 12 months, the permitted proportions of combinations conforming to the requirements of Annex A of BS 8500-2 are:

Strength Class of Combination	Fly Ash Content (%)	
	Min	Max
32,5L	22	35
42,5L	7	29

BS 8500-2 Combination Designation	Fly Ash Content (%)	
	Min	Max
CIIA-V	6	20
CIIB-V	21	35

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**Conformity of Fly Ash to BS 8500-2: Annex A  
Tudela EN 450-1 Fly Ash  
0099-CPR-A95-0019**

Based on the composite samples for the month of: August 2022

Constituent	Source
EN 450-1 Fly Ash	Tudela
EN 197-1 CEM I	Limerick

The results of compressive strength testing (in accordance with BS EN 196-1) of a 70:30 blend of CEM I with Fly Ash were:

2 Day Strength (MPa)	20.1
28 Day Strength (MPa)	48.6

Based on equivalent results obtained for the last 12 months, the permitted proportions of combinations conforming to the requirements of Annex A of BS 8500-2 are:

Strength Class of Combination	Fly Ash Content (%)	
	Min	Max
32,5L	10	35
42,5L	6	25

BS 8500-2 Combination Designation	Fly Ash Content (%)	
	Min	Max
CIIA-V	6	20
CIIB-V	21	35

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**Conformity of Fly Ash to BS 8500-2: Annex A  
Tudela EN 450-1 Fly Ash  
0099-CPR-A95-0019**

Based on the composite samples for the month of: August 2022

Constituent	Source
EN 450-1 Fly Ash	Tudela
EN 197-1 CEM I	Platin

The results of compressive strength testing (in accordance with BS EN 196-1) of a 70:30 blend of CEM I with Fly Ash were:

2 Day Strength (MPa)	19.8
28 Day Strength (MPa)	44.9

Based on equivalent results obtained for the last 12 months, the permitted proportions of combinations conforming to the requirements of Annex A of BS 8500-2 are:

Strength Class of Combination	Fly Ash Content (%)	
	Min	Max
32,5L	12	35
42,5L	6	22

BS 8500-2 Combination Designation	Fly Ash Content (%)	
	Min	Max
CIIA-V	6	20
CIIB-V	21	35

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Tudela EN 450-1 Fly Ash  
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Based on the composite samples for the month of: August 2022

Constituent	Source
EN 450-1 Fly Ash	Tudela
EN 197-1 CEM I	Rugby

The results of compressive strength testing (in accordance with BS EN 196-1) of a 70:30 blend of CEM I with Fly Ash were:

2 Day Strength (MPa)	21.4
28 Day Strength (MPa)	48.6

Based on equivalent results obtained for the last 12 months, the permitted proportions of combinations conforming to the requirements of Annex A of BS 8500-2 are:

Strength Class of Combination	Fly Ash Content (%)	
	Min	Max
32,5L	24	35
42,5L	6	32

BS 8500-2 Combination Designation	Fly Ash Content (%)	
	Min	Max
CIIA-V	6	20
CIIB-V	21	35

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Based on the composite samples for the month of: August 2022

Constituent	Source
EN 450-1 Fly Ash	Tudela
EN 197-1 CEM I	Tunstead

The results of compressive strength testing (in accordance with BS EN 196-1) of a 70:30 blend of CEM I with Fly Ash were:

2 Day Strength (MPa)	20.5
28 Day Strength (MPa)	49.3

Based on equivalent results obtained for the last 12 months, the permitted proportions of combinations conforming to the requirements of Annex A of BS 8500-2 are:

Strength Class of Combination	Fly Ash Content (%)	
	Min	Max
32,5L	27	35
42,5L	6	35

BS 8500-2 Combination Designation	Fly Ash Content (%)	
	Min	Max
CIIA-V	6	20
CIIB-V	21	35

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